

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
23 August 2007 (23.08.2007)

PCT

(10) International Publication Number  
**WO 2007/095483 A3**

(51) International Patent Classification:  
**H04N 9/64** (2006.01)

[RO/RO]; Str. Nedeleanu Ion, Nr. 7, Bl. P33, Ap., 13, Sector 5, Bucuresti (RO).

(21) International Application Number:  
PCT/US2007/061964

(74) Agents: **SMITH, Andrew, V.** et al.; FOTONATION IP Dept., 800 Airport Blvd., Suite 522, Burlingame, CA 94010 (US).

(22) International Filing Date:  
11 February 2007 (11.02.2007)

(81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US (patent), UZ, VC, VN, ZA, ZM, ZW.

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/773,714 14 February 2006 (14.02.2006) US  
11/673,577 10 February 2007 (10.02.2007) US

(63) Related by continuation (CON) or continuation-in-part (CIP) to earlier application:  
US 10/676,823 (CIP)  
Filed on 30 September 2003 (30.09.2003)

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(71) Applicant (*for all designated States except US*): **FOTONATION VISION LIMITED** [IE/IE]; Galway Business Park, Dangan, Galway City, County Galway (IE).

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): **STEINBERG, Eran** [IL/US]; 137 Granville Way, San Francisco, CA 94127 (US). **BIGIOI, Petronel** [RO/IE]; 57 Sceilg Ard, Headford Road, Galway, Co. Galway (IE). **ZAMFIR, Adrian**

Published:

— with international search report

(88) Date of publication of the international search report:  
18 December 2008

(54) Title: DETECTION AND REMOVAL OF BLEMISHES IN DIGITAL IMAGES UTILIZING ORIGINAL IMAGES OF DEFOCUSED SCENES

(57) Abstract: A method automatically corrects dust artifact within images acquired by a system including a digital acquisition device including a lens assembly and a translucent lens cap. Multiple original digital images are acquired with the digital acquisition device (101). Probabilities that certain pixels correspond to dust artifact regions within the images are determined based at least in part on a comparison of suspected dust artifact regions within two or more of the images (140). Probable dust artifact regions are associated with extracted parameter values relating to the lens assembly when the images were acquired. A statistical dust map is formed including mapped dust regions based on the determining and associating (130). Pixels corresponding to correlated dust artifact regions are corrected within further digitally-acquired images based on the associated statistical dust map (400).

WO 2007/095483 A3

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US07/61964

## A. CLASSIFICATION OF SUBJECT MATTER

IPC: **H04N 9/64( 2006.01)**

USPC: 348/243,348/251

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 348/243,348/251

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2005/0001910 (Hoshuyama - 1/6/2005) Figures 1-3, Figure 6, Figure 8; [0134], Lines 1-11, [0038], [0072] - [0077], [0137], Lines 3-5	1,3-5,7,8,10,11,13-17,19 and 20
Y	Hylen (US # 6,167,206) - Col. 6, Lines 43-52	1,3-5,7,8,10,11 and 13-16
Y	Wengender (US 2004/0037457) Figure 3	1,3,17,19 and 20

☐

Further documents are listed in the continuation of Box C.

☐

See patent family annex.

* Special categories of cited documents:		"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E"	earlier application or patent published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search

31 July 2008 (31.07.2008)

Date of mailing of the international search report

**16 SEP 2008**

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Facsimile No. (571) 273-3201

Authorized officer

Lin Ye

Telephone No. (703) 305-9600